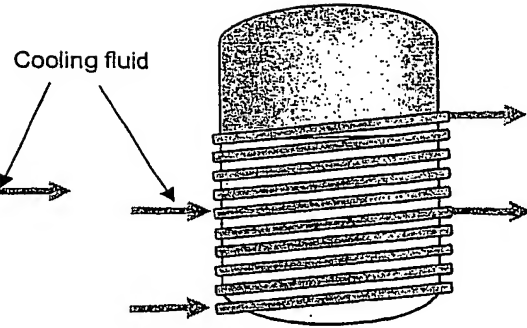


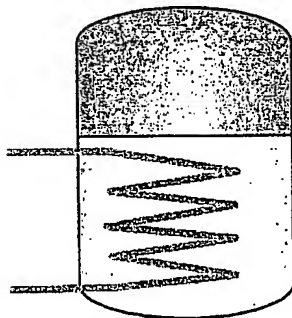
Tank with external heating/cooling jacket

FIGURE 1
(PRIOR ART)



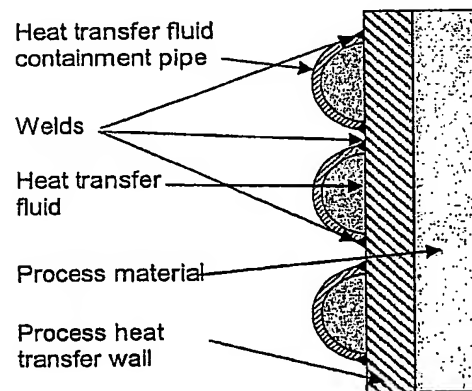
Tank with external heating/cooling half coils

FIGURE 2
(PRIOR ART)



Tank with internal heating/cooling coil

FIGURE 3
(PRIOR ART)



Half pipe jackets get their name from the half pipes welded to the vessel wall

FIGURE 4
(PRIOR ART)

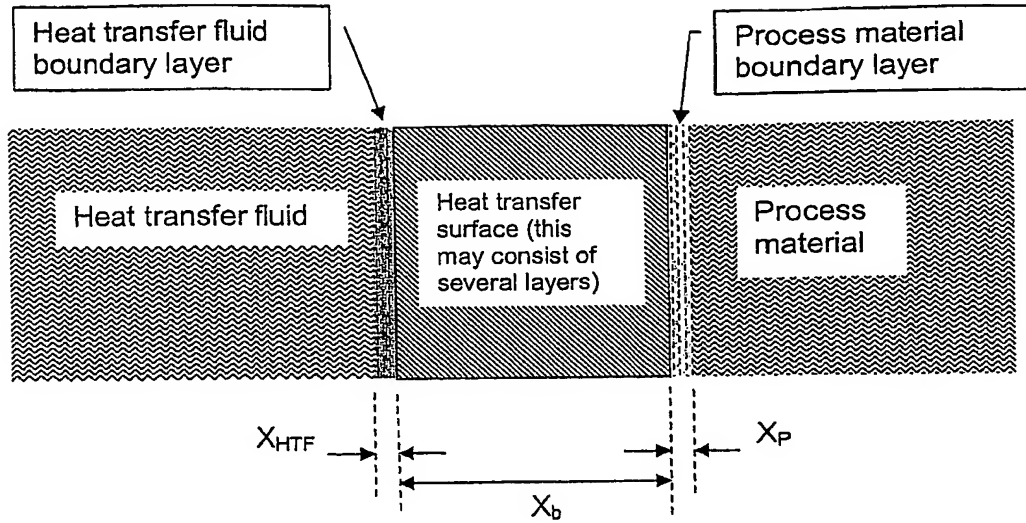
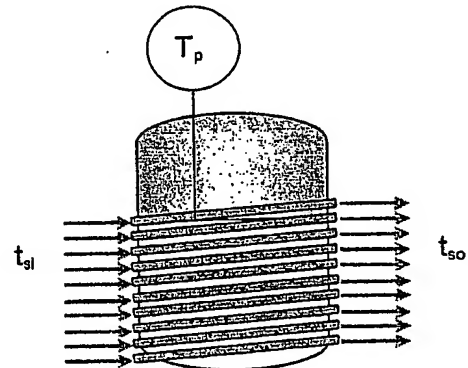


FIGURE 5

T_p = process temperature
 t_{si} = inlet temperature of the heat transfer fluid
 t_{so} = exit temperature of the heat transfer fluid



Heat transfer arrangement
for a reduced volume jacket

FIGURE 6

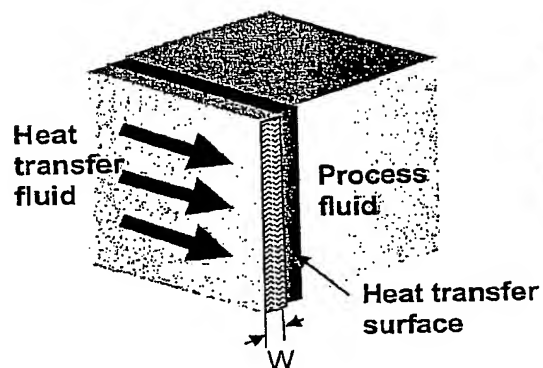


FIGURE 7a

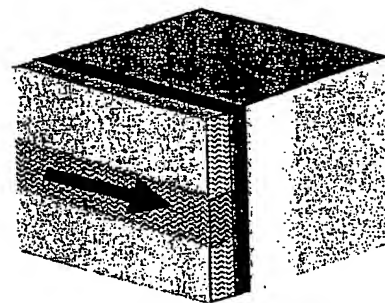


FIGURE 7b

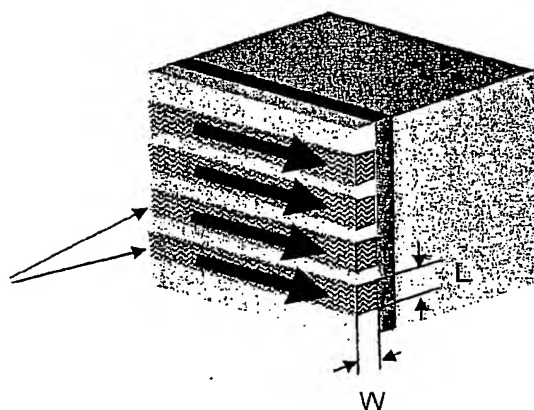


FIGURE 8

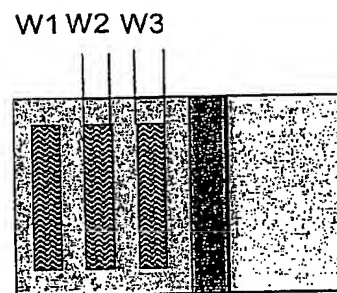


FIGURE 9

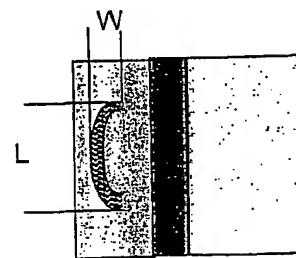
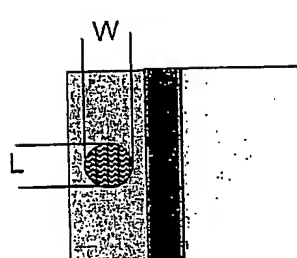
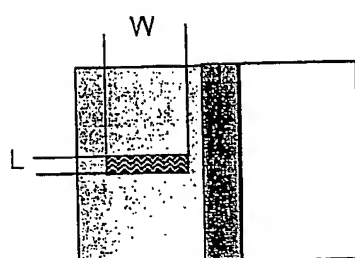
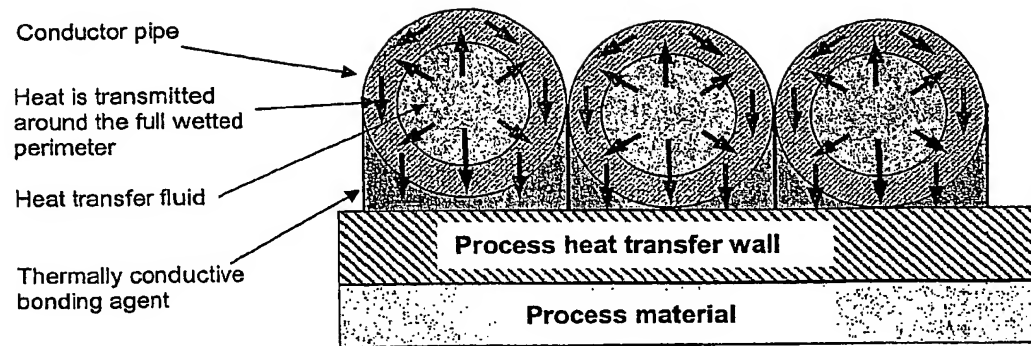
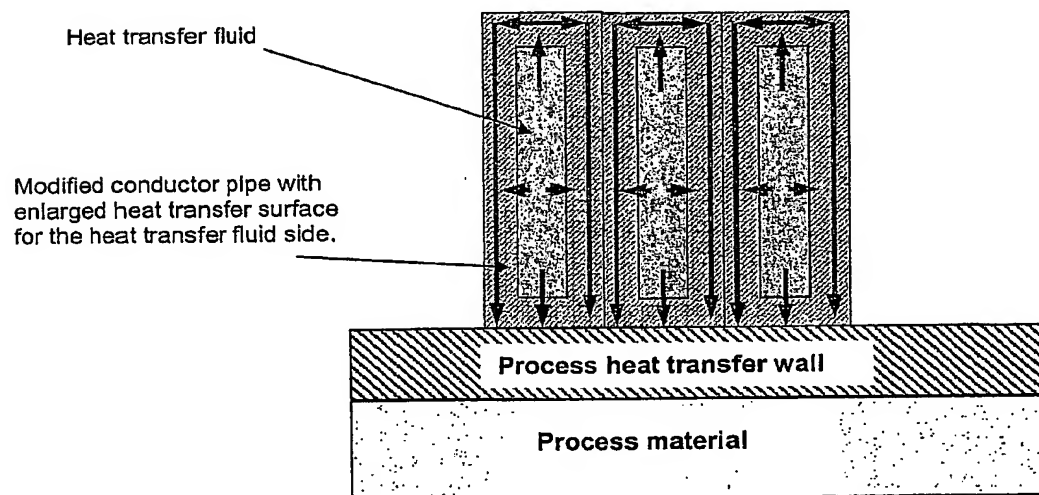


FIGURE 10



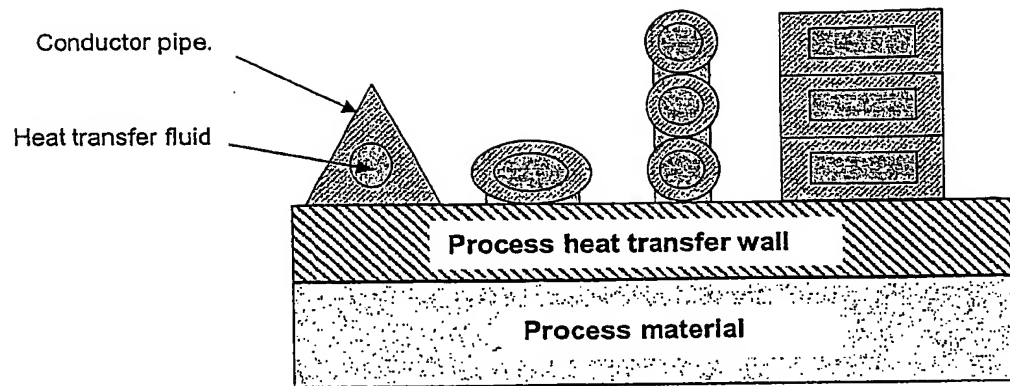
Section showing circular conductor pipes bonded to the heat transfer surface

FIGURE 11



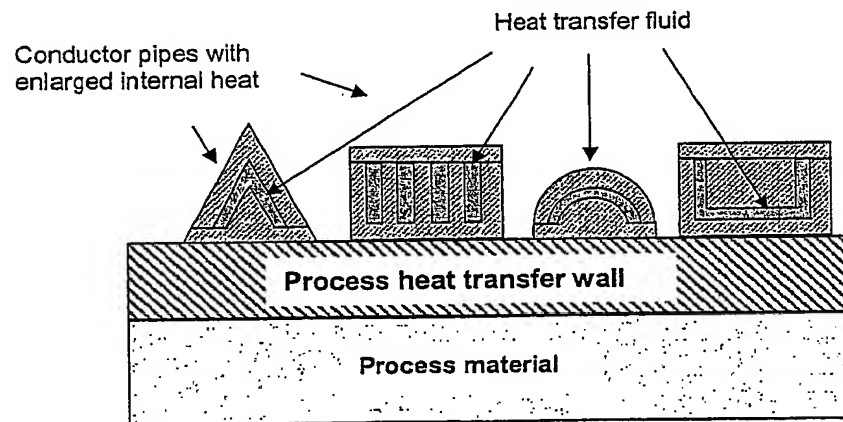
Section through oblong conductor pipes

FIGURE 12



Examples of different conductor shapes and group arrangement

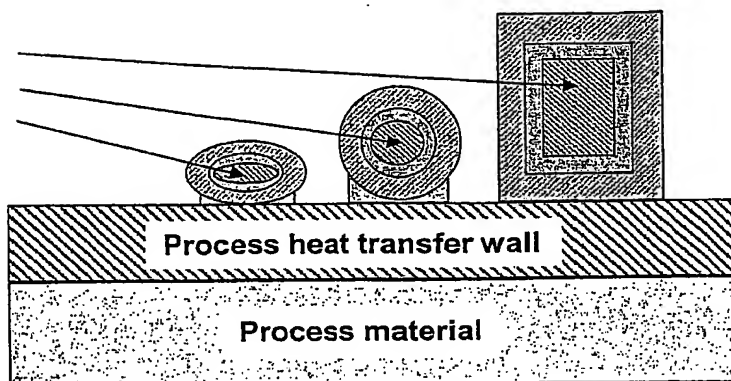
FIGURE 13



Sections through conductor pipes with more complex internal geometry.

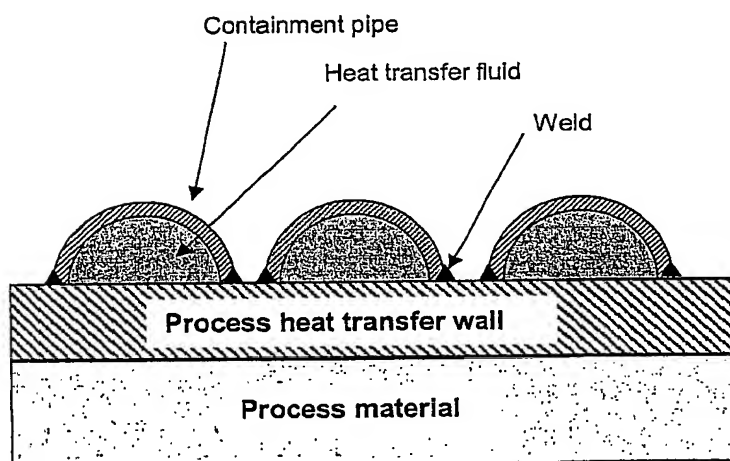
FIGURE 14

Inserts used to reduce
the hold up volume of
heat transfer fluid



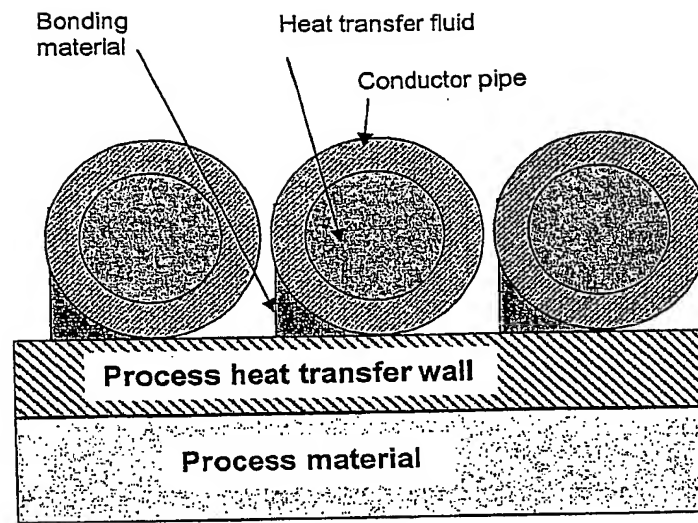
Examples of different inserts

FIGURE 15



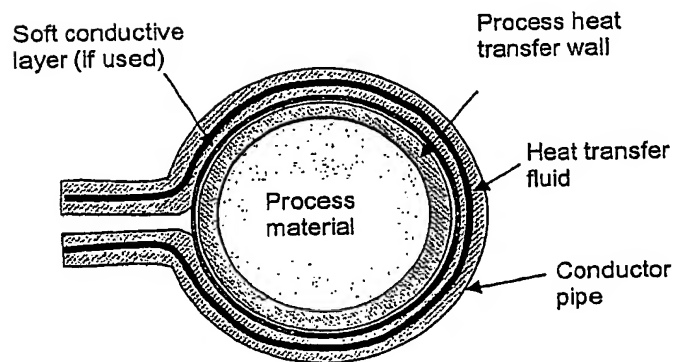
Conventional half coil welds

FIGURE 16



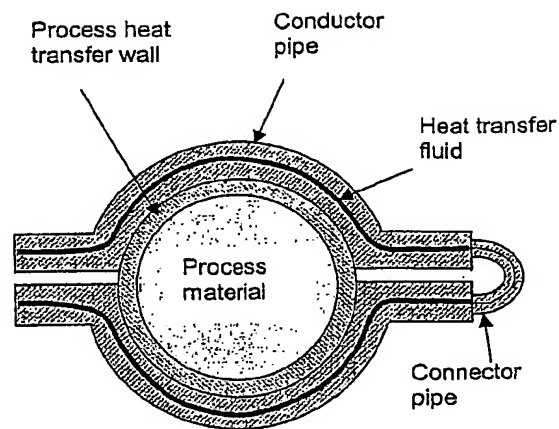
One-sided solder bonding

FIGURE 17



Simple spring mounted conductor pipe

FIGURE 18



Two part mounted conductor pipe configuration

FIGURE 19

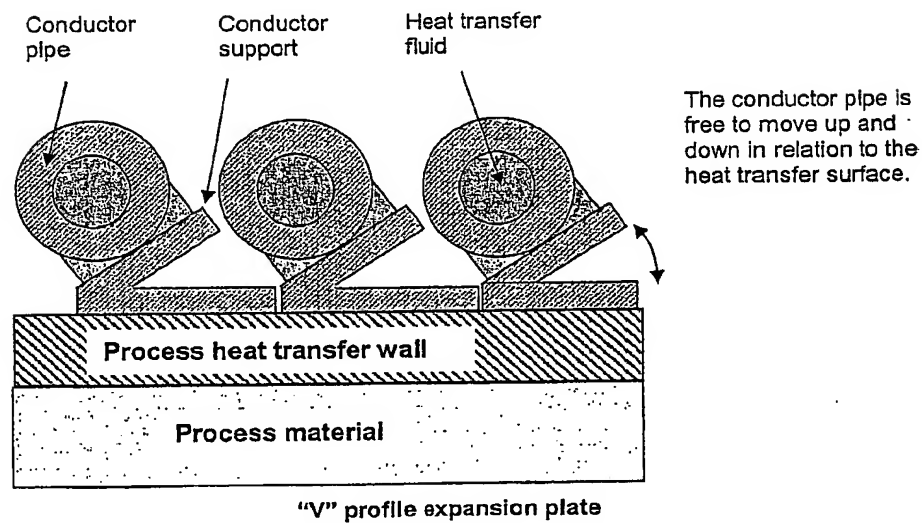
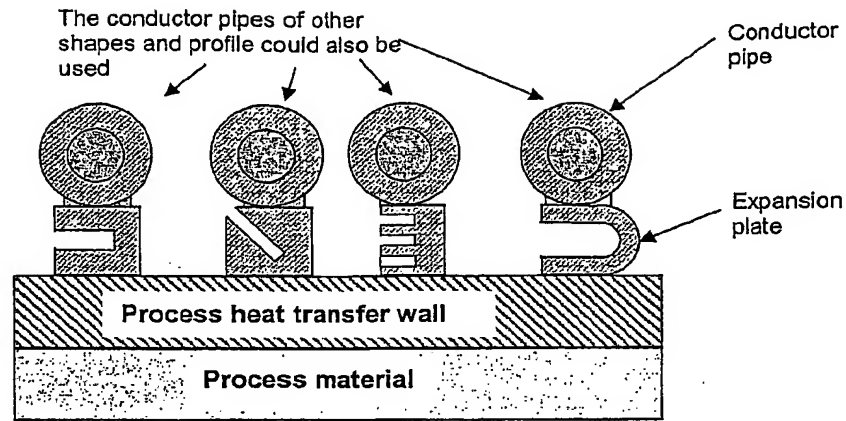
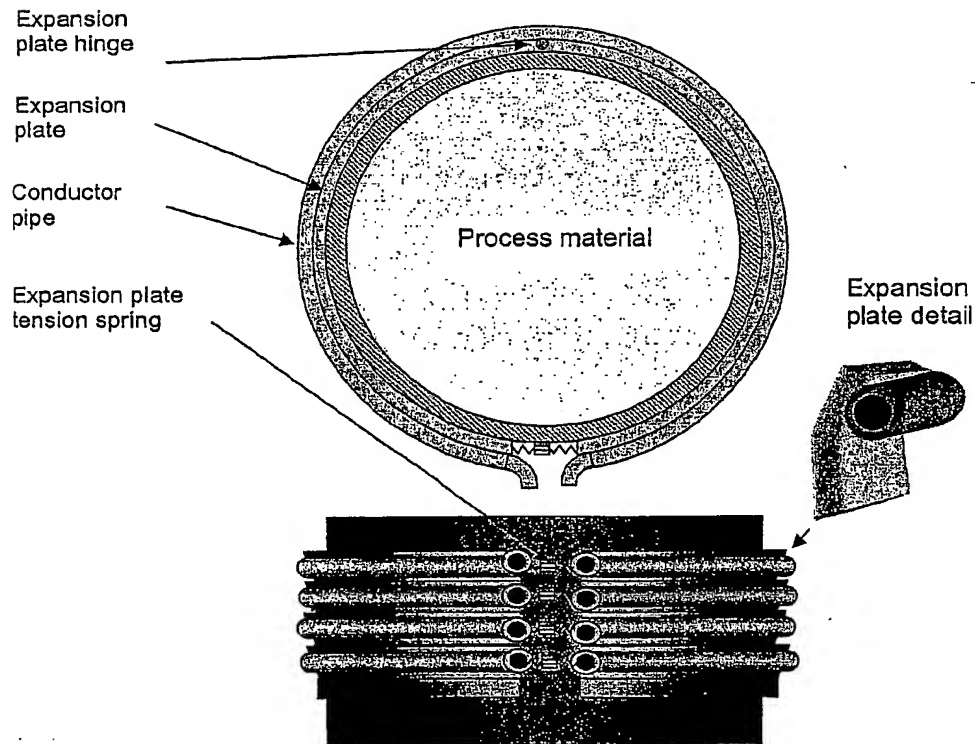


FIGURE 20



Examples of various expansion plate shapes

FIGURE 21



Expansion plates with an open profile

FIGURE 22

Cross section showing expansion plate on a cylindrical vessel.

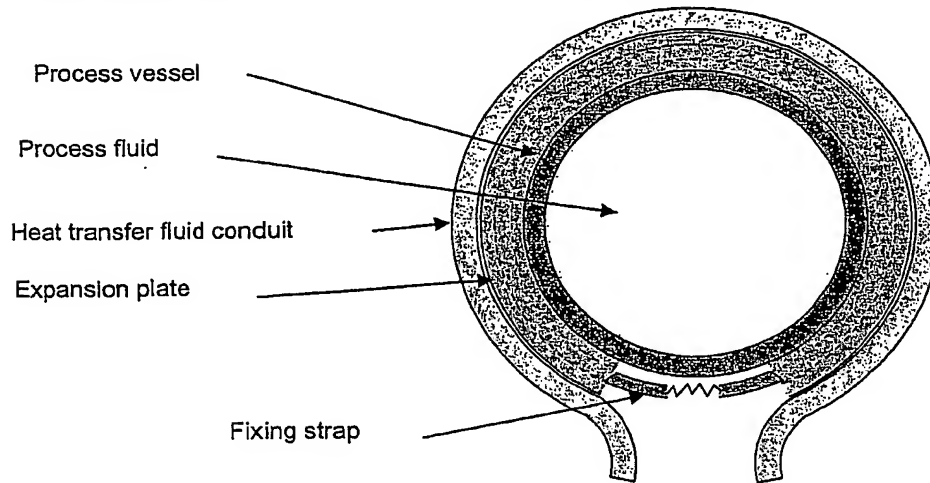


FIGURE 23

Detail showing expansion plate with cold heat transfer fluid conduit.

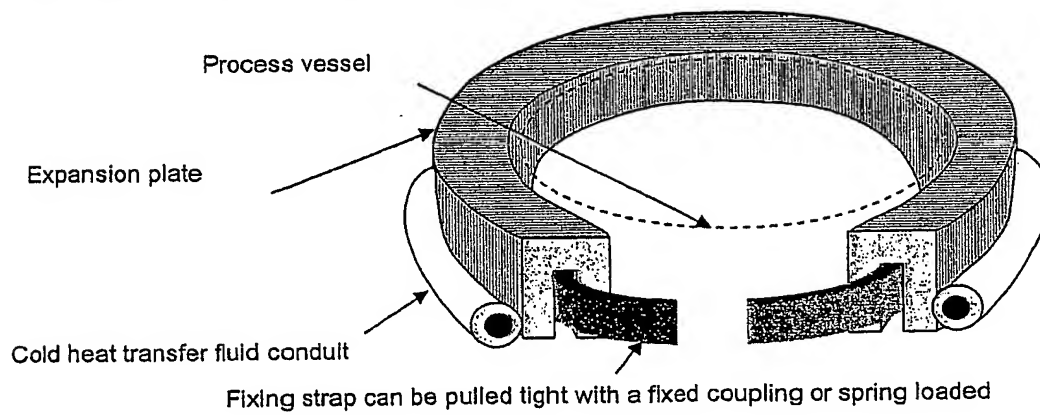


FIGURE 24

Detail showing expansion plate with hot heat transfer fluid conduit.

Outer fin of expansion plate can move out and in independently to accommodate thermal expansion of heat transfer fluid conduit.

Hot heat transfer fluid conduit

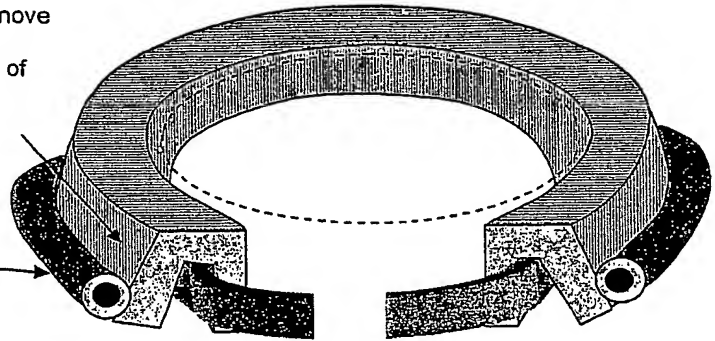


FIGURE 25

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